

Figure 1. Front view of control module

- A. Temperature recorder
- B. Three-function current adjusting temperature controller
- C. High-limit temperature fail-safe
- D. Instrument pilot light
- E. Dual-range pressure recorder
- F. Pressure transducer power supply
- G. Autoclave stirrer tachometer

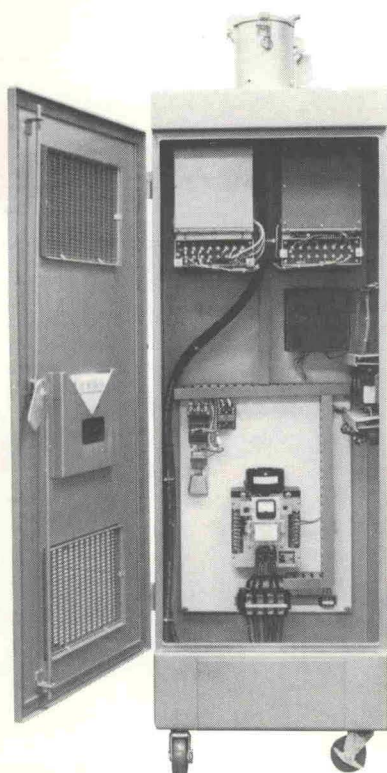


Figure 2. Rear view of control module

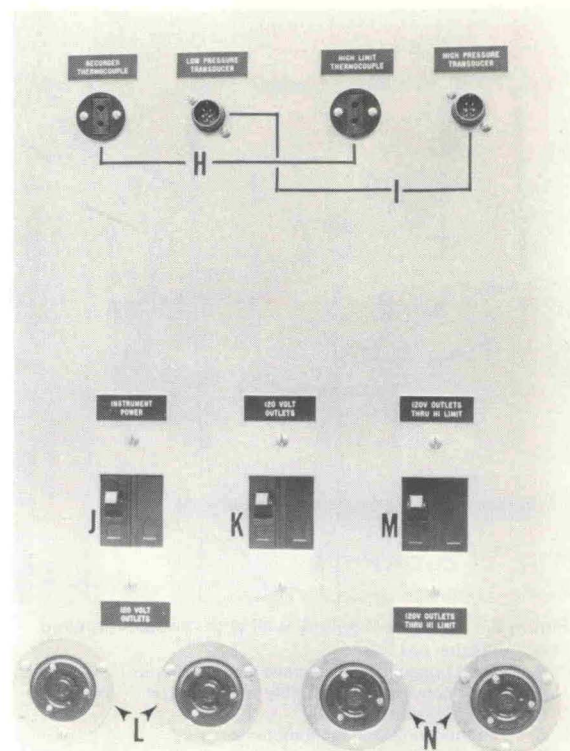


Figure 3. Left side of control module (control and sensing connections)

- H. Recorder and high-limit thermocouple connections
- I. High- and low-range pressure transducer connections
- J. Instrument power supply and circuit breaker
- K, L. 120-V circuit breaker and outlets
- M, N. 120-V circuit breaker and outlets with high-limit temperature and pressure override

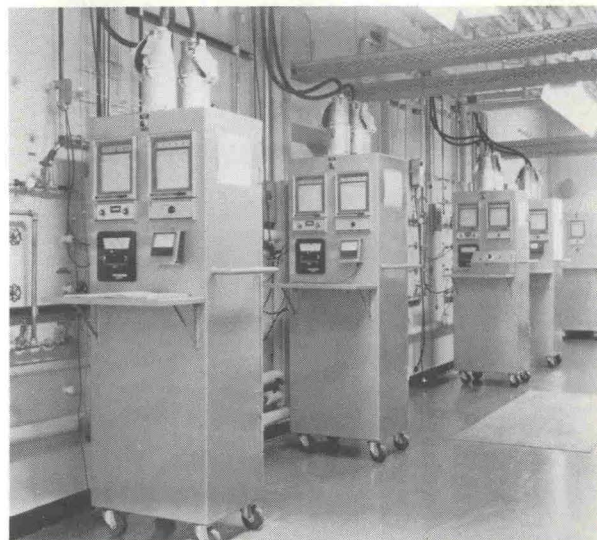


Figure 4. Control gallery with interchangeable modules in place

other two are for the high- and low-range pressure transducers. A 15-A circuit breaker serves the instrumentation. While a 20-A breaker controls each pair of 110-V ac outlets, one of which is wired through the high-limit control. Since one pair of 110-V circuits is used to power agitation, the operator has a choice of maintaining or stopping agitation whenever preset pressure or temperature is exceeded.

In the event of any malfunction, it is a 3-min job to break all connections and move another cabinet into place. A back-up module is desirable; however, one module is usually available because all cells are seldom in operation simultaneously.

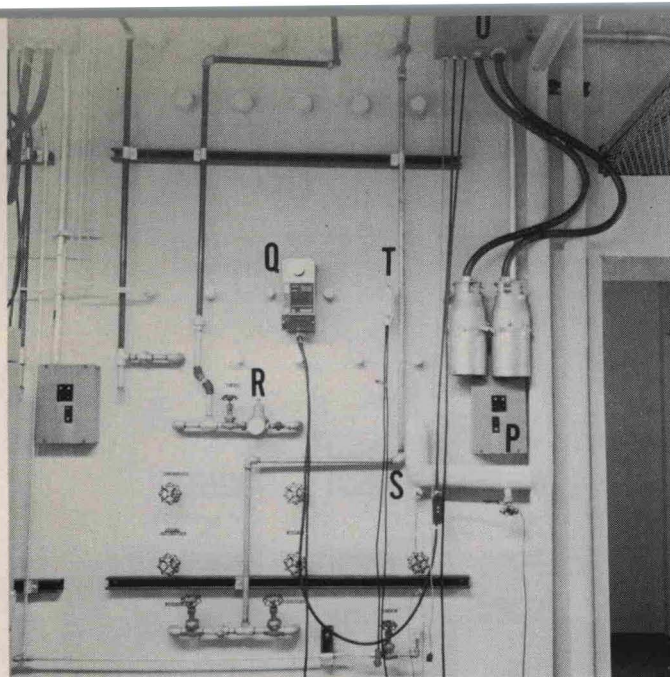


Figure 5. Section of gallery wall with module removed

- Q. Junction box
- P. Circuit breakers for autoclave heating circuits
- Q. Ac-dc converter and variable speed control
- R. High-pressure air supply
- S. Thermocouple and tachometer leads
- T. Transducer leads

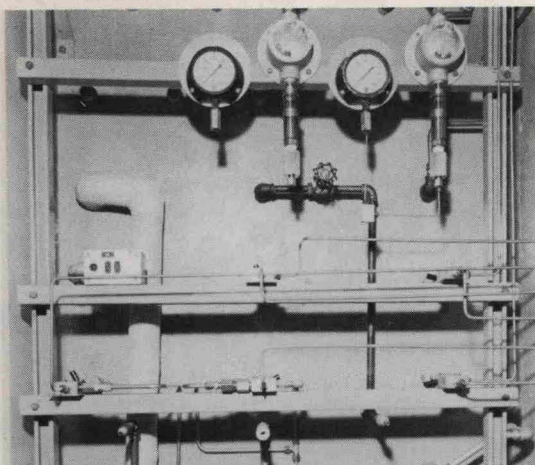


Figure 6. Interior cell wall backing control gallery

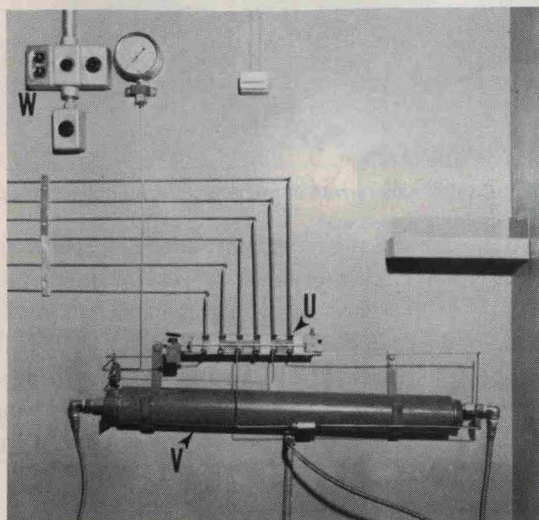


Figure 7. Interior cell wall facing entrance and perpendicular to control gallery wall

- U. Terminal block for permanent pressure plumbing
- V. Pressure intensifier
- W. Electrical connections

Outside the cells. Our control gallery with cabinets in place is shown in Figure 4, and Figure 5 shows a typical exterior cell wall. Our autoclaves are wired with two or three circuits to facilitate control, particularly at low temperatures. Nonelectrical services common to each cell are 125 psi steam, cold water, soft water for cooling coils, high-pressure air, and vacuum. All valves and utilities are located in the same relative positions in each cell.

Inside the cells. The inside cell wall that backs the control gallery wall is shown in Figure 6. A "unistrut" frame was used for mounting valves, pressure gauges, transducers, and the like. The frame itself was installed 10 in. from the wall to avoid utilities. All permanent high-pressure valves, fittings, and tubing are $\frac{1}{4}$ -in. nominal diameter rated for 60,000 psi. Utilities, other than electrical, are terminated in either "quick connects" or flare fittings and are brought out flush with the unistrut frame. These are visible below the third and lowest horizontal bar. Because they are located in the same position in each cell, short standard lengths of flexible hose can be quickly attached to the autoclave. Although standard hydraulic hose is suitable for many applications, we prefer $\frac{3}{8}$ -in. Teflon with braided stainless steel covering and stainless fittings because it withstands higher pressures and temperatures and, of course, is quite inert. The autoclave vent, accumulator vent, and rupture disk assemblies are all

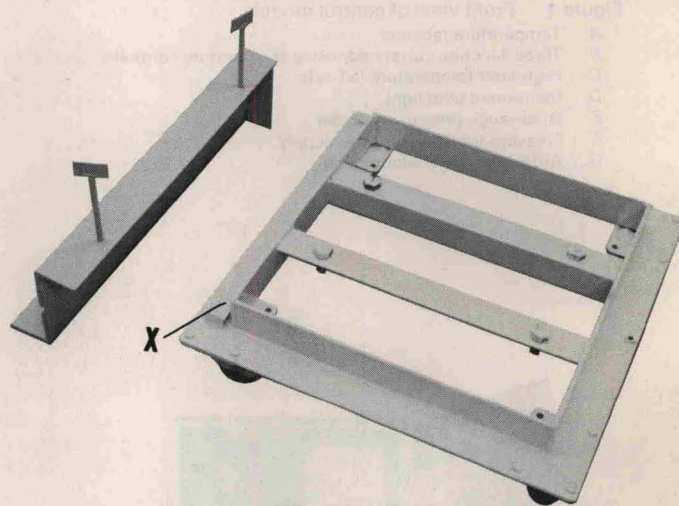


Figure 8. Equipment dolly and hold-down clamp
X. Alignment guide for hold-down clamp

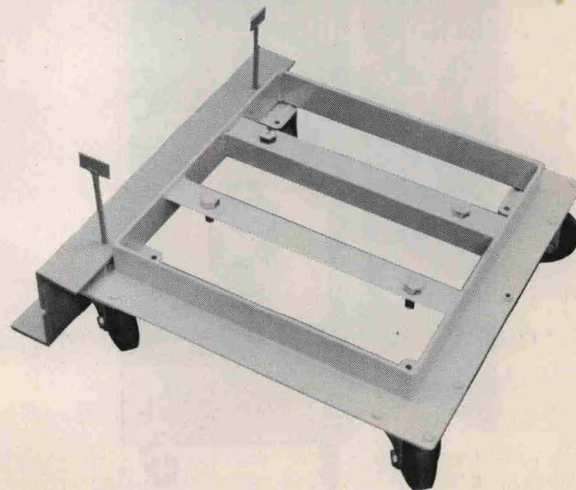


Figure 9. Equipment dolly in clamped position